

Pain and Dysfunction Reported After Gender-Affirming Surgery: A Scoping Review

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Abstract

Objective. The goal of this scoping review was to determine the types and rates of pain and dysfunction outcomes reported after gender-affirming surgical procedures. In addition, a summary of the involvement of conservative care reported in the literature was produced.

Methods. A research librarian conducted searches through multiple databases from inception to 2021. Abstracts and full texts were reviewed by a team of at least 2 reviewers. Data were extracted from a custom survey and exported for summary.

Results. Thirty-one papers discussed masculinizing interventions, and 87 papers discussed feminizing procedures. Most of the studies emphasized surgical outcomes. Of the studies reporting pain or dysfunction, few standardized outcomes were used to collect information from patients. The pain was experienced across body regions after surgery for both feminizing and masculinizing procedures. Vaginal stenosis and incontinence were the most common complications reported. Patients were most often managed by physical therapists for vaginal stenosis or dyspareunia.

Conclusion. Many published studies do not systematically collect specific or standardized information about pain and dysfunction after gender-affirming surgery. Of those studies that do report these outcomes, few detail the involvement of physical therapists in the recovery after surgery.

Impact. Pain and urogenital dysfunction, often managed by physical therapists, occur after gender-affirming surgery, suggesting that physical therapists could have a larger role in the recovery of this patient population after surgery. The extent to which interventions used to manage these conditions in cisgender people will be equally effective in transgender people is unknown at this time. Future studies should use recognized measures to characterize patients' experiences with pain and dysfunction after surgery.

Keywords: Dysfunctions, Dysphoria, Gender, Pain, Surgery

Introduction

People with gender incongruence experience discord between their sexual identity and biological characteristics and may undergo gender affirming surgery (GAS) to match these characteristics with their sexual identity. In GAS, procedures such as mastectomy or breast enlargement, facial feminization surgery, voice surgery, and other masculinization and feminization procedures are performed. Common pelvic and genital procedures include vaginoplasty, clitorolabioplasty, penectomy, and orchidectomy in masculinizing GAS and penile and scrotal reconstruction in feminizing GAS. These surgeries involve complex changes to the anatomy and musculoskeletal structures of the entire upper quadrant and spine, and pelvis.

Little is known about the rates of musculoskeletal pain disorders such as shoulder pain, spinal pain, and pelvic/pelvic girdle pain following GAS. This paucity in the literature is surprising given the recognized prevalence of these pain conditions after similar surgical interventions for other reasons. For example, our own work in pain and physical impairments following mastectomy (a common procedure in surgical transition from female to male) indicates that people who had mastectomy were 1.7 times more likely to report pain in the shoulder and neck and 4.5 times more likely to have soft tissue restrictions and suboptimal movement in the arm and neck than those who did not have surgery.¹

Despite the lack of rehabilitation literature related to the care of these patients, the number of gender-affirming surgeries is steadily increasing. The American Society of Plastic Surgeons reported a 20% increase in GAS from 2015 to 2016.² In the United States, Canner and colleagues reported that the number of individuals who underwent GAS in the United States increased 3-fold from 2012 to 2014. With increases in insurance coverage for these procedures, the number of these surgeries will likely rise.³

Reports of disability are greater in transgender people compared with their cisgendered peers.⁴ The United States Department of Health has identified transgender individuals as underserved and at risk for disparate health care.¹ In addition, the National Academies of Science, Engineering, and Medicine have called for a comprehensive assessment of transgender health.⁵ Taken together, these data suggest that transgender people who have undergone affirming surgery are likely to have higher levels of disability resulting from pain and dysfunction after the complex reassignment surgeries, while at the same time being undertreated.

The goal of this scoping review, therefore, was to determine the types of pain and dysfunction outcomes reported outside the perioperative and immediate postoperative periods after GAS procedures. In addition, we sought to summarize any rates of pain and dysfunction and the involvement of conservative care reported.

Methods

A scoping review methodology was selected to (1) compile data related to pain and dysfunction after GAS, (2) examine the current understanding of the frequency and duration of these dysfunctions available in the literature, and (3) identify gaps that need to be addressed. The chosen framework was based on scoping review guidelines by Arksey and O'Malley⁶ and Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for scoping reviews (PRISMA-ScR [Supplementary Data Sheet 1](#)).

Academic Search Premier (EBSCOHost)
Applied Social Sciences Index & Abstracts (ProQuest)
Biological Science Database (ProQuest)
CINAHL (EBSCOHost)
EMBASE (Elsevier)
Gender Studies Collection (0 results) (GALE)
GenderWatch (ProQuest)
LGBT Life with Full Text (EBSCOHost)
OTSeeker
PEdro
Psychology and Behavioral Sciences Collection (EBSCOHost)
PsycINFO (EBSCOHost)
PubMed
Rehabdata
Sociological Collection (EBSCOHost)
Sociology Database (ProQuest)
SPORTDiscus (EBSCOHost)
Web of Science (Clarivate Analytics)
Women's Studies International (EBSCOHost)

Figure 1. Databases in which the searches were performed.

The protocol was registered (<https://www.crd.york.ac.uk/PROSPERO>; CRD42019086929).

Research Question

What are the types and incidence and/or prevalence of impairments to body structures, activities, or participation after GAS reported in the literature?

Relevant Studies

An initial search for related existing reviews and protocols took place in August 2018, and none were located. Using the inclusion criteria described below, a base search strategy was developed by a health sciences librarian through keyword and subject heading term testing in CINAHL and PubMed. The preliminary search results from these electronic bibliographic databases were reviewed by the project team. The base search strategy was refined and subsequently peer-reviewed by a second librarian.

The full literature search to identify studies for the review was performed from database inception to December 2018, with an updated final search of all databases occurring on October 15, 2021. The base search strategy was adapted for each database ([Fig. 1](#)), using limiters (English language only), applicable subject headings, truncation, and phrase-searching functionality where available. Citation snowballing occurred after the full-text screening was complete. The search databases are included in [Figure 1](#), and the strategy for PubMed is located in the [Supplemental Materials](#). All search strategies are available by contacting the authors.

An EndNote (version X9.2, Clarivate Analytics, Boston, MA, USA) library was created, duplicates were excluded manually, and references were imported into Covidence in preparation for screening. The automated deduplication tool in Covidence located further duplicates.

Title/abstract and full-text review were completed within Covidence, and the PRISMA flow chart was used to report the number of selected and excluded studies throughout the review process. Data extraction was performed using a custom-built survey in Excel.

Study Selection

Inclusion and Exclusion Criteria

The inclusion criteria consisted of full papers published in English and reporting on non-surgical pain with or without dysfunction related to movement (eg, shoulder, neck, jaw, hip, back) and dysfunction related to the urogenital system (eg, prolapse, incontinence, dyspareunia). Citations were excluded if the outcomes were related to the intra- and perioperative

Table. Surgical Procedures Included in This Review

Masculinizing	Feminizing
Phalloplasty/scrotoplasty: surgical construction of a new penis/scrotum	Vaginoplasty: surgical construction of a new vagina
Metoidioplasty: clitoral release/enlargement to construct a penis	Breast augmentation
Mastectomy	Orchiectomy: removal of testicles
Hysterectomy/oophorectomy	Facial feminization
Vaginectomy: removal of the vagina	
Testicular and penile prosthesis implantation	
Facial masculinization	

periods only (eg, surgical revision, hematoma, fistula, etc.). Conference abstracts, letters, and book chapters were also excluded. The Table lists the surgical procedures considered for this scoping review.

Screening and Agreement

Search results were screened in 2 phases. Phase I consisted of title and abstract screening in order to include possible relevant studies and exclude irrelevant ones. Phase II consisted of full-text screening of studies previously identified as possibly relevant in order to select eligible studies. Two independent reviewers conducted screenings of each abstract and full text, in both Phase I and II, and any discrepancy regarding study eligibility was discussed between reviewers. In the event that the reviewers could not agree, a third reviewer broke the deadlock.

Data Extraction

Extraction parameters were jointly defined a priori by 2 authors (M.J.A., M.D.B.). Research personnel performed data extraction from each paper using Excel. Consistent with recommendations for scoping reviews, quality appraisal was not performed during this review.^{6,7} The data extracted from eligible studies included the author, year and title of the paper, type of study, types of surgery performed, the reported complications, and any referral to other providers (outside the surgical team). Where appropriate, the number of people who had surgery, their ages, and the duration of follow-up were extracted.

Collating, Summarizing, and Reporting the Results

Data were descriptively summarized according to the following data items:

- Basic numerical analysis of the number of studies related to each type of surgery
- Summary of types and prevalence of complications report by surgical procedure

Results

A total of 1811 abstracts were identified through literature searches and review of bibliographies. After removal of duplicates and screening, 810 papers received full-text review. Five hundred seventy-eight (578) were excluded, and 114 studies were reviewed for data extraction. The primary reasons for exclusion were (1) outcomes were not related to non-surgical pain, musculoskeletal dysfunction, or urogenital dysfunction, and (2) abstract only. Data were extracted from 114 papers. These procedures and reasons for exclusion are shown in the PRISMA diagram (Fig. 2). The final list of papers and characteristics extracted are available from the authors.

Number of Studies Related to Each Type of Surgery

Thirty-one papers discussed surgical interventions considered masculinizing and 87 papers discussed feminizing procedures. Three papers included outcomes for both masculinizing and feminizing procedures. There was a gradual increase in the number of papers that fit our search criteria over time. The majority of the papers identified were reports of clinical data from surgical practices or groups, with the frequency of narrative and systematic reviews increasing over time (Fig. 3). Urogenital procedures were the most common procedures reported (vaginoplasty reported in 82 papers and phalloplasty or metoidioplasty in 27).

Types and Prevalence of Complications Report by Surgical Procedure

Masculinizing Procedures

Mastectomy

Six papers described complications after mastectomy. In 1 study, 25% of people reported “mild or moderate” chest pain after surgery, whereas the other study reported 8% of patients reported pain but did not report the intensity. A third indicated patients report postoperative pain and decreased range of motion but did not include the numbers of patients in whom this occurred. Lang et al.⁸ indicated 7 out of 84 patients reported constant pain in the chest at follow-up, 13 experienced pain daily, 11 at least once a week, and 7 reported chest pain once a month. Intensity of pain ranged from mild (14) and moderate (7) to severe (2). In additional, 10% of people experienced “phantom breast sensations” after mastectomy.⁹ Wierckx compared the outcomes from cisgender women and men and transgender people undergoing breast reduction and mastectomy. Results indicated there was no difference in the bodily pain domain on the SF36 among the groups.¹⁰

Hysterectomy/oophorectomy

A comparison of complications after hysterectomy performed indicated that the overall complication rate in cisgender women and transgender men is equivalent after hysterectomy.¹¹

Genital procedures

Twenty-seven papers described phalloplasty or metoidioplasty. Pelvic, abdominal, back, and bladder pain was reported as an outcome in multiple papers. However, limited details were presented regarding the assessment methods or intensity of the pain reported. For example, Moulder indicates in a narrative review “myofascial pain syndrome” is associated with complications or sequelae of gender-affirming surgery (ie, vaginectomy, urethral reconstruction, scrotoplasty, metoidioplasty, phalloplasty) with specifically indicating how this might be affecting patients.¹² The donor site for muscular grafts taken to construct the neophallus is also often an area

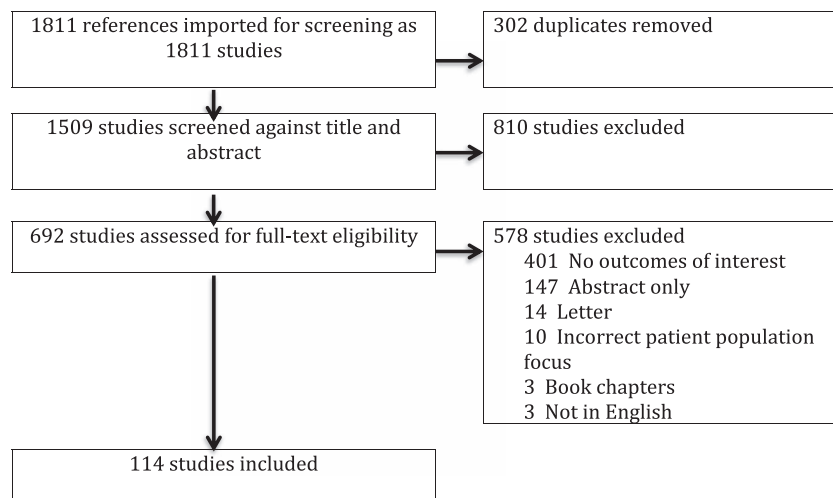


Figure 2. PRISMA diagram.

of pain and dysfunction with loss of range of motion (ROM) and strength^{13,14} and pain.¹⁴ Selvaggi noted that “in all cases, these findings resolved with physical therapy within a 2- to 6-month period.”¹³

Incontinence was described in 12 studies. However, few studies reported any standardized assessment for determining the type of incontinence experienced after phalloplasty or metoidioplasty. Symptoms reported included urge and stress incontinence, as well as “micturition issues,” retention, dribbling, spraying.

Dyspareunia (pain during intercourse) was described as a possible complication after masculinizing genital surgery. No standardized measures are reported, nor the specific rate at which it was experienced. However, DeCuypere reported that <50% of people were able to experience pain-free intercourse, indicating that the majority of people were experiencing painful intercourse.¹⁵ One of the narrative reviews suggested that transgender men with painful orgasm would benefit from referral to a pelvic health physical therapist.

Testicular implantation

One study reported on outcomes after testicular implantation. Approximately 13% of people required explantation. “Discomfort” was indicated as one potential reason for explantation; however, the number of patients for whom this was the case was not reported.¹⁶

Feminizing Procedures

Breast augmentation

Complications from breast augmentation were reported in 6 studies. The overall rates of all complications were not different comparing cisgender women and transgender women.¹⁷ Chest pain was reported in 12.5% of patients during follow-up that varied from 0 to 3 years after surgery.^{18,19} Numbness and scarring were reported at a low rate; 1 person in a study of 34 people undergoing augmentation.²⁰

Feminizing vaginoplasty

Vaginal stenosis was the most frequently mentioned complication with rates ranging from 1 to 42%. The most common method for identifying vaginal stenosis was examination by the surgeon at follow-up or self-reported difficulty with penetration. The recommendation for referral to a pelvic

health physical therapist to manage stenosis is made in 5 of the review papers.^{21–25} One paper suggested that some patients could benefit from presurgical pelvic floor physical therapy to manage preexisting pelvic muscle tension or myalgia that might prevent adequate dilator therapy.

Commonly reported incontinence symptoms included “leakage,” urgency, urge, hesitancy, spraying, and retention; however, which measure used to determine the type of incontinence was rarely reported. The only meta-analysis calculated the rate of all incontinence symptoms to be 16.9%.²⁶ Individual studies reported the rates ranged from 11 to 90% of some type of urinary dysfunction. One paper included data from validation of the Appearance Domains of the Post-Affirming Surgery Form and Function Individual Reporting Measure (AFFIRM) survey. Only considering urge and stress incontinence, the rate in this study was 46%.²⁷ One study indicated that the rate of “urinary dysfunction” was ~28% and did not differ between people who attended presurgical PT to prepare for surgery compared with those who did not.²⁸

Pain was reported in the lower back, hip, pelvis, genitals (not sex related), and abdomen across multiple reviews and empirical studies of vaginoplasty. Of these studies reporting pain, up to 40% of patients reported pelvic pain unrelated to intercourse. In 1 study of 139 patients (that did not report the follow-up time period), 91 people reported pain that was “moderate” and 24 reported “high” pain.²⁹ Few studies reported the instrument used to measure pain or the intensity. Prolonged pain reported at a median follow-up time of 21 months was reported as a minor complication.³⁰ In addition, patient describe “phantom” penis pain after penectomy.³¹ Only 1 paper described pain or symptoms after facial procedures and reported “head and face” pain as possible outcomes without providing the rate of this complication.³²

Dyspareunia was reported in multiple review articles with 1 systematic review reporting a median rate of 19%³³ but ranging from 0 to as high as 75% depending on the assessment method. Multiple methods were used for assessing dyspareunia including standardized questionnaires for cisgender women [eg, female sexual function index (FSFI)] as well as customized “satisfaction” surveys that included single item questions. One study that used the FSFI indicated 32% of sexually active transgender people versus 14% of the cisgender women were below the FSFI cutoff score indicating

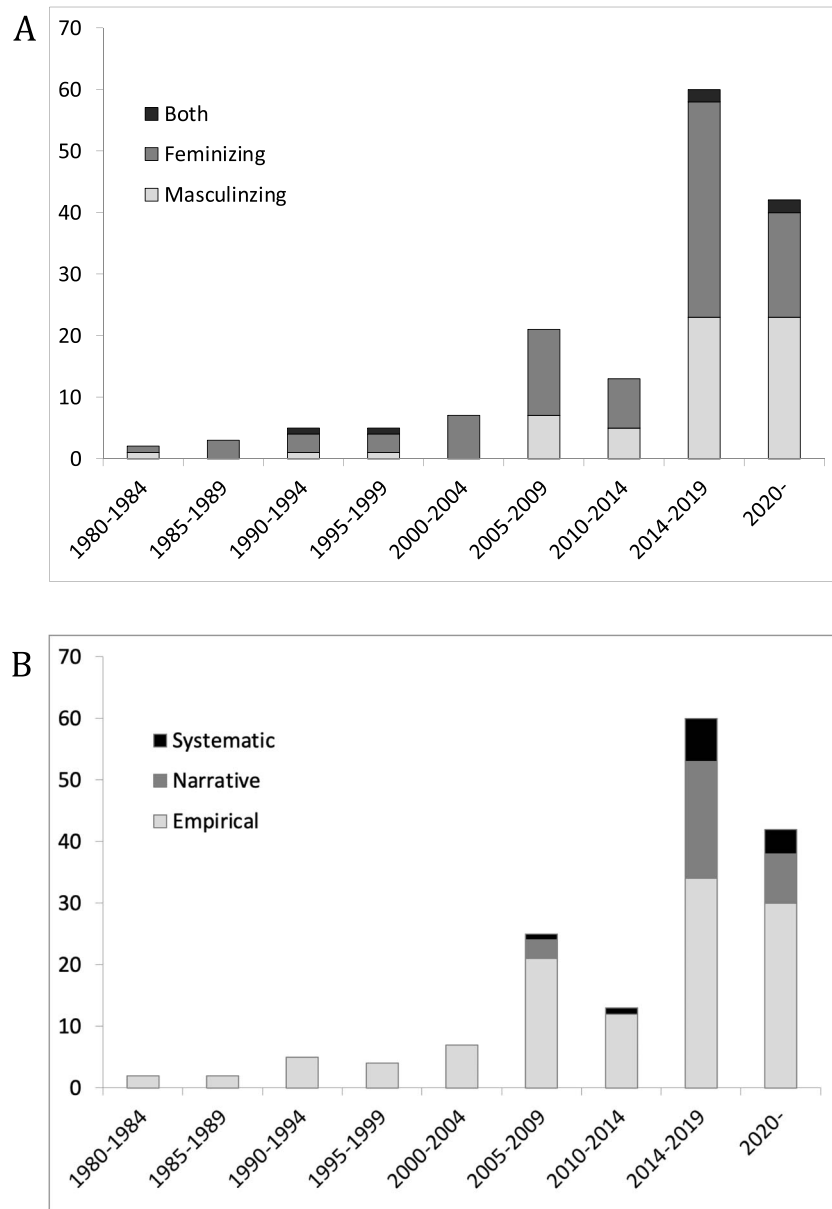


Figure 3. Proportions of papers meeting criteria by 5-year block. (A) Types of gender assignment procedures reported. (B) General category of paper; Systematic = systematic review; Narrative = narrative review or opinion piece; Empirical = a paper presenting author's own data.

sexual dysfunction and suggesting “critical levels of sexual discomfort.”³⁴ Referral to physical therapists for management is mentioned in 2 reviews.^{24,33}

Vaginal prolapse was described in 26 papers. Prolapse rates varied by type of vaginoplasty procedure used to create the neovagina and the type of fixation used to maintain the position of the vaginal vault within the abdomen with the rates ranging from 0 to 17%. In all cases, prolapse was managed surgically.

Other

While outside the domain of rehabilitation interventions, a very common urogenital complication reported in many papers that physical therapists should be aware of was urethral stricture affecting people after both feminizing and masculinizing genital procedures.

Referral to Other Physical Therapists in the Included Papers

Inclusion of physical therapists in patient management was described in 12 papers. Most frequently, this was in the context of improving pelvic health, for example managing stenosis of the neovagina and painful intercourse. One paper also indicated physical therapists working with patients to improve mobility and strength and range of motion related to the donor site for the muscular grafts used during phalloplasty.¹³

Discussion

The first goal of this review was to determine the types of pain and dysfunction outcomes that are being reported in the current body of evidence related to GAS procedures. The majority of papers identified in our search were reports

from surgical groups or reviews in physician-centric literature. Consequently, many of the data and summaries focused predominantly on surgical outcomes, for example, fistulae, hematomas, and wound and graft healing, and recovery of patients from the procedures. Nonetheless, we did find multiple sources that reported longer-term complications that might benefit from conservative interventions provided by physical therapists.

Incontinence was reported as a common complication. This finding is perhaps not surprising given the complex urogenital reconstruction that occurs in GAS. Few studies reported using standardized methods to assess incontinence, and many did not report how incontinence was determined. As a result, a variable rate was reported ranging from 0% with incontinence to 72% with incontinence in masculinizing procedures to 90% in feminizing procedures. For studies that differentiated between types of incontinence, rates were lower, with approximately 24% reporting urge and 13% reporting stress incontinence after vaginoplasty. Other disorders of micturition frequently reported include spraying, nocturia, and urinary retention. No paper included in this review explicitly reported referring patients to a pelvic health PT or provided a recommendation for physical therapy to address incontinence complications.

Conservative management by physical therapists was mentioned predominantly in papers that reported on vaginal stenosis or dyspareunia. Vaginal stenosis was the most frequent complication reported for feminizing genital procedures. Only 1 paper explicitly suggested a presurgical consult with a pelvic health PT to address postsurgical management of the pelvic floor. Dyspareunia/painful intercourse was reported as affecting people after both masculinizing and feminizing genital surgery, with higher rates of sexual pain after feminizing procedures. Referral to PT for management was suggested in a limited number of papers. Each of these disorders, incontinence, stenosis, and dyspareunia, is related to pelvic floor integrity and function. The European Network for the Investigation of Gender Incongruence surveyed 260 transgender people about their experiences with care after GAS. Although not specifically focused on the rates of complications, the results emphasized that people seeking care for gender affirmation wanted health care providers to provide more guidance about surgical recovery, psychological support after surgery, and seeking “physiotherapy for the pelvic floor.”³⁵

Vaginal prolapse was also listed as a complication in several papers. The primary cause of prolapse was related to surgical fixation of the neovagina and not to pelvic floor (dys)function. Nonetheless, physical therapists should be aware that prolapse occurs in up to 11% of people after vaginoplasty. The urinary stricture was also very common, presenting as disrupted urine flow or difficulty voiding. Stricture should be considered by PTs working with people after genital reconstruction.

Pain (non-sexual intercourse-related) was frequently reported related to the postoperative recovery period. As noted earlier, the primary interest for many of the papers was the rate of surgical complications, and longer-term pain or movement symptoms were not commonly collected as part of follow-up visits or surveys. In those studies where people were asked, areas of the body with pain included the chest in up to 25% of people after mastectomy and 12.5% after breast augmentation, and the back, hip, pelvis,

abdomen, and genitals for other procedures. Pain and range of motion limitations are common after mastectomy in cisgender women and are frequently managed by physical therapists. In addition, a large comparison of complication rates after mastectomy indicated no differences in the rates between cisgender and transgender people who underwent a mastectomy. Care by physical therapists is common after mastectomy in cisgender people, suggesting that transgender people would likewise benefit from care by physical therapists after surgery. Similarly, pain-related dysfunctions in the back, pelvis, and abdomen often respond to conservative interventions, suggesting a role for physical therapists in the postoperative care of people after surgery.

Collectively, the results of this scoping review suggest that patients who underwent GAS experience musculoskeletal complications that are commonly addressed by physical therapists in other patient populations. Still, physical therapy was rarely recommended as a method to address these complications. These data, along with the predicted increase in individuals undergoing GAS, suggest that physical therapists may potentially benefit from improved education and training to enhance rehabilitation outcomes related to musculoskeletal pain and pelvic floor dysfunction in this patient population.

Limitations

Many of the papers included did not report the instruments used to assess the complications we have included in this review. Other studies used custom-built surveys that may not have been validated to collect information about the specific complications. For example, studies often reported pain as complication without a rating of intensity or the context in which that rating was framed. A similar difficulty was encountered with the broad definitions used by investigators and authors related to incontinence and dyspareunia. Consequently, caution must be taken when interpreting the results of our review.

Recommendations

Studies of the outcomes after gender-affirming surgery could be strengthened by the inclusion of recognized definitions for complications such as pain, dyspareunia, and incontinence. Additional information regarding limitations to activities would also be useful for providers of conservative health care such as physical therapists.

Author Contributions

Concept/idea/research design: M.D. Bishop, J. Morgan-Daniel,

M.J. Alappattu

Writing: M.D. Bishop, J. Morgan-Daniel, M.J. Alappattu

Data collection: M.D. Bishop, J. Morgan-Daniel

Data analysis: M.D. Bishop

Consultation (including review of manuscript before submitting):

J. Morgan-Daniel

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Systematic Review Registration

This protocol was registered on PROSPERO (CRD42019086929).

Disclosures

The authors completed the ICMJE Form for Disclosure of Potential Conflicts of Interest and reported no conflicts of interest.

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